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Sound-Object-Space: A Case Study on Utilizing Musical Composition for an Interdisciplinary Basic Design Education

Draft Paper by

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The basic design education, which is implemented as a freshmen year studio training at schools of art, design and architecture, has a particular importance in developing students' mindsets. In spite of its practical and contextual differences among the institutions worldwide, the basic design studio commonly aims to constitute a particular design language and designerly skills to be internalized and used by the designer lifelong. Today, the curricular and procedural distinctions of most basic design studios are set as bare adaptations of Bauhaus origin in which various fields of art and design were associated in an *interdisciplinary* manner.

In this paper, refering to the analogies between two major fields; *music* and *architecture*, the concept of *basic design* is re-defined as a domain including various mental and sensual skills. In this respect, *the basic design studio* is considered as a venue for self-exploration of the design student while transforming a non-visual composition into a design project. It is investigations into the relationships between music and architecture that is important in the search for a *collateral form of thinking* in design process. It is only through such a collateral view that various forms of art and design may once again come together to create a *symbiosis*. Establishing interactions between visual and non-visual, and by doing so enriching the content of basic design studio, a design student is inevitably provided with a system of thought and a perspective that can enable him/her to perceive and analyze the designed environment in a multi-dimensional manner.

Keywords: basic design, music, architecture, interdisciplinary, symbiosis, collateral form of thinking, musical composition

Introduction: The Search for an Interdisciplinary Basic Design Education

Founded in 1918, Weimar Bauhaus was the first school where a basic curriculum related to the education of creativity and basic design principles was executed. Including all disciplines of design and all types of craftsmanship techniques, an architectonic understanding of the arts was dominant at the school. In 1919, Walter Gropius, the founder of the school, manifested his philosophy associating all disciplines of the arts and crafts: "the aim of all creative efforts is to give form to space" (Benton, 1975, p.119).

The methodological framework of Bauhaus curricula was reinforced with Rudolf Arnheim's visual perception theory based on the principles of Gestalt psychology, which had been improved contemporaneously with Bauhaus: "The unification of comprehension and perception leads to visual thinking. Comprehension is the whole mental processes related to receiving, storing and functioning the knowledge while sensory perception could be defined as an activity of reminding, thinking and learning" (Arnheim, 2004, p. 82).

Unlike Arnheim's approach to visual thinking, Smith proposes an inclusivist and multi-dimensional perceptual thinking method, as a pre-requisite to art and design education, in which all senses and bodily skills are manipulated.

In his book 'Poetics of Architecture, Theory of Design' the architect and theorician Anthony C. Antoniades quotes a prose of Lionel Salter on Bela Bartok's Dance Suite as a 'music-architecture analogue' and makes the following comment on this particular structural reading

of a musical composition: “To read passages such as this, to listen to musical works like those described, to extract structural, conceptual, tactile and textural essentials and to attempt to design buildings or urban design sequences on these principles would be very rewarding and most creative exercise” (Antoniades, 1990, p. 269).

This study searchs for *types of symbiosis* within the mental world of the individual to fulfill the objectives of an inter-disciplinary basic design education. In this context, remarkable examples of sound-space analogies in terms of various designerly aspects, are presented and discussed in Section 1. In Section 2, based on a three-staged basic design project, namely ‘sound-object-space’ conducted in Art and Design Studio in Faculty of Fine Arts and Design in Izmir University of Economics, selected student works are presented and examined as a case study. In view of the analogical layers described in Section 1, the similarities and distinctions between the designerly inclinations and individualistic approaches of the selected students are evaluated. Consequently, the primary objectives of the basic design education are re-defined in order to conceptualise the main criteria for an interdisciplinary studio environment in which the *musical composition* is introduced and utilized as a *conceptual tool*.

1. Types of sound-space analogies

In what ways musical sound is spatialized? Paul Waterhouse (1921, p.325), in his article “Music and Architecture”, underlines that the arts of painting, sculpture and literature “have all in common that they are engaged, perhaps primarily engaged, in *representation* or, as Aristotle would have called it, *mimesis (imitation*)” and that “…music and architecture are the two non-imitative arts...”

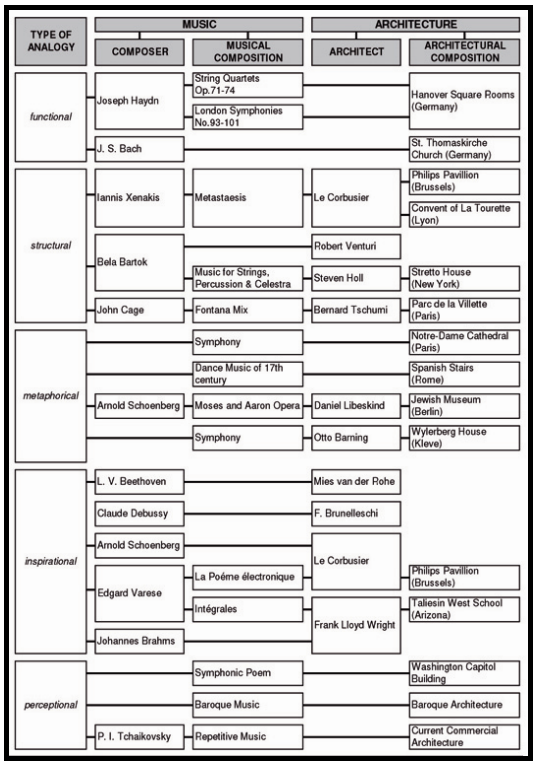
Due to contradistinctions in phenomenal presences (abstract-tangible) of music and architecture; it is hard to encounter a direct and uni-dimensional link between the concepts of sound and space (Pasin, 2007, p.3). Rather, based on an analogical chart, this study focuses on the possible indirect relations between these two. The chart displays a net of multiple relations, connecting not only musical compositions to those of architecture but also composers to architects and/or their works, all grouped under five types of analogies: *functional, structural, metaphorical, inspirational* and *perceptional* (Figure 1).

Waterhouse (1921, p. 325) highlights that “… music is functionless, but architecture is possessed of construction as its function”. In the case of a musical performance, the architectural space could be considered as an entity for the musical sound, which provides a means of function for the musical composition. Music has always been associated with such a particular acoustical and architectural setting; *the functional analogy* depicted initially in the chart. The quality of the sound as received by the audience is paramount and the acoustic requirements for the appreciation of the music is a fundamental condition. However the development of classical music has also experienced variation in the acoustical environment. Until the nineteenth century, music was composed in response to its environment, with, as an example, the liturgical recitation in the basilican church using the effect of the long reverberation time as an integral part of the music (Appleton, p. 8).

The structural analogy is a multi-dimensional type provided by mathematical orders, formal structure and the design language shared by the two disciplines. During the Middle Ages, there was a close relationship between the architecture conceived and the music composed in that both were expressions of the medieval concept of cosmic order, built by Platonic and Pythagorean thoughts. Enabling musical tones refer to a logic of aritmetical proportions has

been utilized by the Renaissance architects as well to organize the architectural solids in accordance with the ratios of golden section. This long-term convention lead to idiosyncratic approaches of the 20th century composers and architects, exclusively Bela Bartok and Le Corbusier.

Figure 1. An Analogical Chart for Sound-Space Relations



Many definitions and depictions of spatial composition in essence refers to *a metaphorical analogy* between music and architecture. The philosopher Friedrich Wilhelm Schelling, for instance, presents architecture as ‘solidified’ music in his lectures on ‘Philosophy in Art’, his colleague Schopenhauer wrote something similar in 1918 in his abstract on ‘The World as Will and Imagination’: Architecture is frozen music (Sack, 1997, p. 24). These are strange metaphorical definitions that suggest absolutely unmusical mind. Victor Hugo in his book ‘Notre-Dame De Paris, (1999, p. 108) depicts the cathedral as “a vast symphony in stone”. Similarly, Rasmussen (1964, p. 136) indicates that ‘the Spanish Steps in Rome are “the solidified forms of the dance figures in the 17th century”.

The inspirational analogy, as the fourth type, is a matter of similarities between the creativity processes of the composer and the architect. Murray (1956, p. 26) subdivides the inspirational paralellisms between music and architecture; defining the ways Beethoven and Mies van der Rohe shape their ideas as the constructivists while relating the approaches of Debussy and Schoenberg to the ones of Brunelleschi and Corbusier as the pioneers.

Murray (1956, p. 28) focuses on the perceptional analogy introducing three intersecting layers of musical and spatial experience: *sensuous, expressive* and *technical*. Sensuous appreciation of architectural form, a delight in form for the form’s sake has at best, produced the qualities of great baroque architecture, similarly baroque music. In the consideration of expressive form there lies another architectural-musical parallel – music that always says the same thing is boring – a problem that plagues much of Tchaikovsky’s music. Music that is slightly

different with each hearing has a greater chance of living. Buildings that always say the same thing are boring – in this regard current commercial architecture is somewhat suspect.

It is significant to note that the two figures, Le Corbusier and Arnold Schoenberg, are not represented with a single type of analogy in the chart. The former had utilized the structure of the musical composition in his architecture while the latter had given a metaphorical inspiration to spatial design; both meeting at the inspirational type as well. As a result, it could be expected that various unique approaches are likely to occur in an interdisciplinary design process, particularly in a multi-staged transition from sound to space, which will be discussed in the case study.

2. The case study

2.1. The scope of the study and the studio process

The project is conducted as a one-month abstraction process in four basic design studios each consisting of approximately 20 students from four different departments of the faculty: architecture, interior architecture, industrial design and communication design. Considering that the data obtained from the first two periods is satisfactory enough for the assessment, the last two periods are not included in the scope of this study. In each studio process having exactly the same requirements, there exists only two variables: the students and the musical pieces analysed.

2.2. The stages of the project: sound-object-space

The project was comprised of three stages: group analysis and 2D abstraction of the musical piece (sound), designing a 3D assemblage (object) to be installed in an interior environment (space). The initial stage was an introductory level in which the analysis and 2D abstraction of a musical piece were required. In the analysis phase, the students were asked to make seven groups of three to four members. Each group was randomly assigned an orchestral musical piece selected by their instructors. They were required to analyse and visually represent these pieces in accordance with the musical topics and their sub-topics defined in the assignment sheets given: structure-theme, rhythm-repetition, harmony-melody-pitch, intensity and timbre (Table 1) which had been briefly introduced before they started their analyses.

Table 1. Topics and sub-topics defined for the group analysis phase of the first stage

TOPIC	**DEFINITION**
STRUCTURE	the way in which parts (themes) are arranged or put together to form a whole
Sub-topic: theme	any element, motif, or small musical piece that has given rise to some variation becomes thereby a theme
RHYTHM	the order of a repetition (ABCBA or ABAB, etc)
Sub-topic: repetition	the occurrence again and again; duplication over and over
HARMONY	simultaneous combination of musical melodies having notes of different pitches in a pleasing manner
Sub-topic: melody	a rhythmically organized sequence of single tones so related to one another as to make up a particular phrase or idea
Sub-topic: pitch	the relative position (high or low) of a tone within a range of musical sounds
INTENSITY	the magnitude or volume of sound
TIMBRE	the quality or tone distinguishing voices or instruments; tone color

In the abstraction phase, the students were asked to transform the formal and thematic characteristics of the analysed piece of music into 2D compositions using regular geometric shapes and linear elements on a sturdy board, without leaving any undefined area. The aim of this phase was to organise the visual elements of design (Table 2) in order to represent particular characteristics of an audial artwork. The relations among these elements like unity, dominance, linearity, (a)symmetry, visual balance, variety, dynamism, transformation, etc. were not re-defined in the assignment sheet, but implemented during the studio critiques and referred in the assessment.

Table 2. Basic elements of design defined for the 2D abstraction phase of the first stage

ELEMENT	**DEFINITION**
Line	the combination of points to make a continuous mark
Geometric Shape	a regularly formed area (like a square, circle, triangle, rectangle, etc.)
Form	the combination of shapes that gives an appearance of an object; figure
Texture	the distinctive physical composition or structure of something, especially with respect to the size, shape, and arrangement of its parts
Colour	the aspect of objects that is caused by differing qualities of the light reflected or emitted by them
Composition	the act or art of composing, or forming a whole or integral, by placing together and uniting different things, parts, or ingredients

In the second stage, each student was asked to produce a 3D assemblage (object) using industrially produced materials; a level of further abstraction. In the final stage, the students were asked to install their abstract objects in an interior environment (space) of their choice. The media they used were photomontages by which they were able to represent where and how they placed their objects.

2.3. The assessment of the selected works

In this sub-section, the 2D and 3D works of four selected freshmen students; each from a different department and analysis group (Table 3), is compared and discussed with respect to their symbiotic approaches in relating the basic elements of musical sound to those of architectural space.

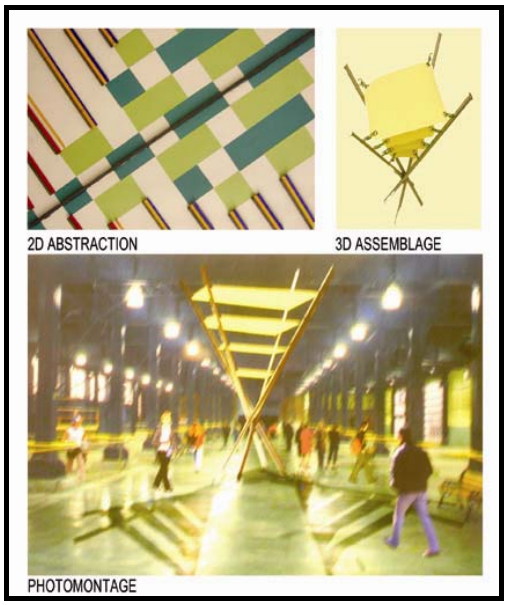
Table 3. Selected students, their analysis groups and reference musical pieces

Analysis group	**Musical piece analysed**	**Composer of the piece**	**Group members**	**Student selected**	**Student's department**
Group 1	Bolero Alla Marcia Karelia Suite	Maurice RAVEL	CU, CG, TP	CU	Communication Design
Group 2	Concerto Grosso No:1	Alfred SCHNITTKE	OzgeH, YEG, BE, ATB	OzgeH	Architecture
Group 3	French Suite No. 2 (Badinerie)	J. Sebastian BACH	KD, EP, KB, AlpA	KD	Industrial Design
Group 4	Minuet in G Major	Ludwig van BEETHOVEN	MS, BA, SC, OzgurH	MS	Interior Architecture

As a member of the first group, CU focused on the four characteristics of Ravel's music obtained in the group analysis stage: increase of the intensity, regular rhythmic and melodic repetition, linearity, and harmonic unity. In 2D abstraction stage, he represented the regularity

of the rhythm with a rectangular grid, the increase of the intensity with squares and rectangles expanding in size and the harmonic unity with the organization of linear elements in contrasting colours. Yet in 3D stage, he used only two of these characteristics: expansion and linearity.

Figure 2. 2D, 3D and photomontage works by CU

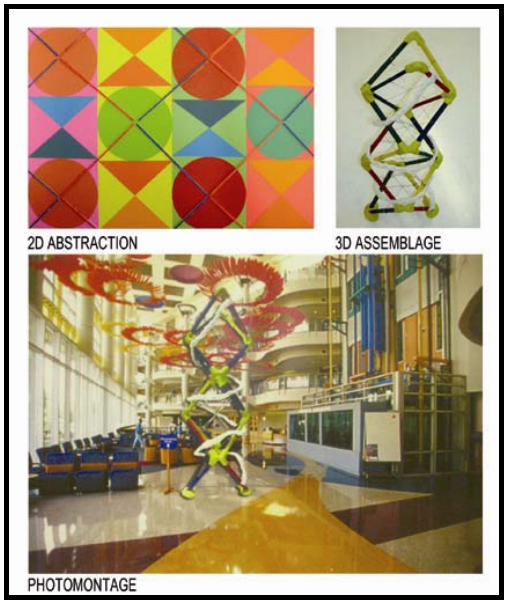


The characteristics of Schnittke's music that OzgeH referred in her 2D abstraction, were the dominance and repetition of the main theme, rhythmic variation, melodic contrast and eclectical unity. In her 3D work, like CU, she prefered using only two of these concepts: melodic contrast and eclectical unity. Hanging his eclectical object in a library's entrance space where linearity and simplicity are dominant, she created a similar contrast to that of Schnittke's music (Figure 3).

Figure 3. 2D, 3D and photomontage works by OzgeH

In KD's 2D abstraction, following characteristics could be observed: the balance of two contrasting themes, harmonic layering of the structure, contrasting timbres, regular rhythmic order and linearity of the intensity. In 3D stage, he produced a spiral skeleton made up of wooden linear elements, surrounded by copper wires and cotton fabrics representing various instruments played in Bach's music in terms of structure.

Figure 4. 2D, 3D and photomontage works by KD



MS, the selected member of the fourth group, focused on the following characteristics of Beethoven's Minuet: thematic variations, opposite rhythms, dominance of the strings and stability of the intensity. In her 2D abstraction, she reflected the thematic variety and opposite rhythms while the linearity of this pattern composition is an abstraction of the constant intensity as well. In her 3D object, MS prefered to use the characteristics of variation and linearity perceived in the music.

Figure 5. 2D, 3D and photomontage works by MS

2.4. Discussion

The assessment of the selected works display particular data in terms of the students' creative and mental skills improved during the design process. It could be clearly identified that all those students intend to eliminate some characteristics of the musical piece obtained in the analysis stage to emphasize certain others, enabling sequential levels of abstraction in following stages as shown in Table 4.

Table 4. The characteristics of musical pieces refered in various stages of the project

Student	**Stages of the project**		
	Analysis	**2D Abstraction**	**3D Assemblage**
CU	increase of intensity rhythmic repetition melodic repetition linearity harmonic unity change in timbre	increase of intensity rhythmic repetition melodic repetition linearity harmonic unity	increase of intensity linearity
OzgeH	variety of intensity variety of timbre dominance of theme repetition of theme rhythmic variation melodic contrast eclectical unity	dominance of theme repetition of theme rhythmic variation melodic contrast eclectical unity	melodic contrast eclectical unity
KD	contrasting themes harmonic layering contrasting timbres regular rhythm linearity of intensity	contrasting themes harmonic layering contrasting timbres regular rhythm linearity of intensity	contrasting timbres regular rhythm
MS	melodic symmetry harmonic unity variety of themes opposite rhythms dominance of timbre stability of intensity	variety of themes opposite rhythms dominance of timbre stability of intensity	variety of themes stability of intensity

Designerly approaches of the selected students in relating sound to space is another issue to be discussed with reference to various types of analogies implemented in the first section. In this context, the students had not limited themselves to a single type of analogy (Table 5)

5. Types of sound-space analogies displayed by the four students

Student	**Types of analogies**			
	functional	**structural**	**metaphorical**	**inspirational**
CU	sea-port-land	linearity-depth	planes-sails	– –
OzgeH	– –	eclectic-simple	– –	use of contrast
KD	– –	variety	joyful-colorful	– –
MS	minuet-entrance	curvilinear form	– –	– –

Although the students are in the freshmen level of design education, the variety of their disciplines have also made a certain effect in their design processes. This may be due to their pre-knowledges about specific design fields and personal interests in their future professions.

3. Concluding Remarks

As treated and discussed in various sections of this paper, a collaboration between music and architecture provides the specialists of both disciplines with an inter-disciplinary environment where they are able to interact with each other in terms of design. This interaction leads to a break in the existence boundaries enabling them to explore various designerly aspects that exist in both fields. Based on a series of exercises in which an audial realm is visualised, this case study displays various advantages of this exploration for an inter-disciplinary basic design education.

Firstly, analysing a non-visual realm introduces the students with new concepts of design language broadening the existing domain of visual communication. In this context, no matter what their departments are, they all have the opportunity to share a common hybrid design language created by a symbiosis juxaposing the elements of art and design. Secondly, the necessity of purification in representing the analysed work with a different medium helps the students to improve their mental skills; particularly abstract thinking. Thirdly, utilizing various types of analogies between both disciplines enables them to make personal interpretations of a musical composition and create unique ideas to be referred in their design process.

In summary, this three-staged project of sound-object-space has a unique contribution to fulfill the expected objectives of a freshmen level basic design education: stimulating creativity, improving problem-solving skills and providing a mode of design communication. It is remarkable that such an inter-disciplinary basic design process, as an initial step of design education, may furtherly be enhanced by utilizing not only audial but also tactile and bodily artworks that could contribute to the existing fields of design education in various aspects.